

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 08 June 2001 (08.06.01)	
International application No. PCT/IB00/01452	Applicant's or agent's file reference 45.113 GIST
International filing date (day/month/year) 29 September 2000 (29.09.00)	Priority date (day/month/year) 01 October 1999 (01.10.99)
Applicant PERUZZO, Massimo et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
27 April 2001 (27.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Cécile Chatel (Fax 338.87.40) Telephone No.: (41-22) 338.83.38
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PCT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

BONINI, Ercole
Studio Ing. E. Bonini Srl
Corso Fogazzaro, 8
I-36100 Vicenza
ITALIE

Date of mailing (day/month/year) 05 février 2002 (05.02.02)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 45.113 GIST	
International application No. PCT/IB00/01452	International filing date (day/month/year) 29 septembre 2000 (29.09.00)

1. The following indications appeared on record concerning:

☒ the applicant
 ☐ the inventor
 ☐ the agent
 ☐ the common representative

Name and Address GIST SNC DI PAROLIN LUIGI E CAMILLO & C. Via Ramon, 10 I-36028 Rossano Veneto Italy	State of Nationality IT	State of Residence IT
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
 ☒ the name
 ☐ the address
 ☐ the nationality
 ☐ the residence

Name and Address OFFICINE PAROLIN S.N.C. di Parolin Stefano, Peruzzo Massimo e C. Via Ramon, 10 I-36028 Rossano Veneto Italy	State of Nationality IT	State of Residence IT
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office
 ☐ the International Searching Authority
 ☐ the International Preliminary Examining Authority
 ☐ the designated Offices concerned
 ☒ the elected Offices concerned
 ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Dominique DELMAS Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY
PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 45.113 GIST	FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small>	
International application No. PCT/IB 00/01452	International filing date (day/month/year) 29/09/2000	(Earliest) Priority Date (day/month/year) 01/10/1999
Applicant GIST SNC DI PAROLIN LUIGI E CAMILLO & C. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 00/01452

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A63B69/16 A63B21/005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 475 207 A (KEMPSON ARTHUR HENRY; WESTWOOD, MORRIS AND CO) 16 November 1937 (1937-11-16) page 2, line 48 -page 3, line 87; figures 1-4	1
A	US 5 916 067 A (MORASSE LIONEL) 29 June 1999 (1999-06-29) column 4, line 1 -column 6, line 16; figures 1-5	1-3,6,7, 9,14,15
A	US 5 382 208 A (HU HUI-HSIN) 17 January 1995 (1995-01-17) column 2, line 10 -column 3, line 11; figures 1-4	1,2,6, 10-12
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

28 March 2001

Date of mailing of the international search report

04/04/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Levert, C

INTERNATIONAL SEARCH REPORT

International Application No

PO B 00/01452

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 91 08024 A (SCHUMACHER JEAN MICHEL) 13 June 1991 (1991-06-13) page 4, line 30 -page 6, line 34; figures 1-3,6</p> <p>-----</p>	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC B 00/01452

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 475207 A		NONE	
US 5916067 A	29-06-1999	CA 2191921 A	03-06-1998
US 5382208 A	17-01-1995	NONE	
WO 9108024 A	13-06-1991	BE 1003439 A	24-03-1992

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 45.113 GIST	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/IB 00/ 01452	International filing date (day/month/year) 29/09/2000	(Earliest) Priority Date (day/month/year) 01/10/1999
Applicant GIST SNC DI PAROLIN LUIGI E CAMILLO & C. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

2



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/TB 00/01452

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63B69/16 A63B21/005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 475 207 A (KEMPSON ARTHUR HENRY; WESTWOOD, MORRIS AND CO) 16 November 1937 (1937-11-16) page 2, line 48 -page 3, line 87; figures 1-4	1
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A	--- US 5 382 208 A (HU HUI-HSIN) 17 January 1995 (1995-01-17) column 2, line 10 -column 3, line 11; figures 1-4	1,2,6, 10-12
	--- -/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

28 March 2001

Date of mailing of the international search report

04/04/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-3016

Authorized officer

Levert, C

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/01452

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 91 08024 A (SCHUMACHER JEAN MICHEL) 13 June 1991 (1991-06-13) page 4, line 30 -page 6, line 34; figures 1-3,6</p> <p style="text-align: center;">-----</p>	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 00/01452

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 475207 A		NONE	
US 5916067 A	29-06-1999	CA 2191921 A	03-06-1998
US 5382208 A	17-01-1995	NONE	
WO 9108024 A	13-06-1991	BE 1003439 A	24-03-1992

PCT

REC'D 04 JAN 2002

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

WIPO PCT

(PCT Article 36 and Rule 70)

4

Applicant's or agent's file reference 45.113 GIST	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB00/01452	International filing date (day/month/year) 29/09/2000	Priority date (day/month/year) 01/10/1999
International Patent Classification (IPC) or national classification and IPC A63B69/16		
Applicant GIST SNC DI PAROLIN LUIGI E CAMILLO & C. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 27/04/2001	Date of completion of this report 02.01.2002
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer DIAZ, M Telephone No. +49 89 2399 7534



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB00/01452

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

2-7	as originally filed			
1,1a	as received on	06/12/2001	with letter of	05/12/2001

Claims, No.:

1-15	as received on	06/12/2001	with letter of	05/12/2001
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Drawings, sheets:

1/6-6/6	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB00/01452

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-15
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1) Although claims 1 to 15 meet the requirements of Art. 33(2)-(4) PCT with respect to the available prior art, amendment is required to overcome the objections below.
- 2) A braking assembly with the features of the preamble is known from D1: GB-A-475 207.

The problem may be regarded as how to provide an easier and quieter braking assembly.

This problem is solved in the known braking assembly with the features described in the characterising part of claim 1. In particular it is not known from the searched prior art documents a braking assembly having dissipation means which comprise a disc of amagnetic material fixedly keyed to said first roller with the surface arranged between a couple of magnetic pieces supported by a moveable fork integral with said rigid frame and connected to actuating means adapted to move said magnetic pieces in respect of said disc.

Therefore, the skilled person had no incentive to include such feature in the known tong in order to solve the problem posed. Consequently, the subject-matter of claim 1 meets the requirements of Art. 33(2)-(4) PCT.

- 3) Claims 2-15 are dependant from 1 and define preferred embodiments. They also meet the requirements of Article 33(2)-(4) PCT.

Re Item VII

Certain defects in the international application

Claim 10 as originally filed is dependant from claim 6. The applicant has amended claim 1 to a new claim 1 which is the combination of claims 1, 2 and 10 as originally filed. Since the new claim 1 does not combine also claim 6, the amendment is not possible (Art. 34 (2)b)).

BRAKING UNIT FOR BICYCLES

The invention relates to a bicycle braking assembly to carry out training of cyclists.

It is known that cyclists wanting to train using their own bicycle, are using proper braking assemblies that are engaged with the driving wheel to obtain an adjustable resisting torque opposing its rotation carried out with the pedals.

GB-475207 discloses an exercises machine, particularly a bicycle, where the driving wheel engages and drives a movable support comprising an endless band carried by rollers.

More particularly the braking assemblies of known type are applied to braking stands used in gymnasias and generally in closed rooms, comprising a tripod supporting the bicycle which is arranged in a vertical position with the driving wheel raised from the ground and engaged with the braking means.

According to the state of the art devices, the braking assemblies comprise one or more rollers with a substantially horizontal axis contacting the tyre of the driving wheel and connected to an electromagnetic, hydraulic or mechanical brake provided with regulation means adapted to change the resisting torque.

The above mentioned braking assemblies however have some drawbacks.

A first drawback consists in that in use a friction is generated between the wheel and the braking rollers so that the tyre is quickly deteriorated.

Since primarily in racing bicycles the tyres are made of special materials and therefore are particularly expensive, this is clearly an unnecessary rise of costs for the user.

A further drawback consists in that in use a considerable noise is generated that sometimes cannot be tolerated for instance when the braking assembly is applied on braking stands used in gymnasias and generally in closed rooms.

Use of the above mentioned braking assemblies is particularly problematic when they are used with bicycles like mountain bikes provided with tyres having a tread with deep grooves.

In such a case in addition to the considerable wear of the tyre of the driving wheel and greater operation noise, annoying vibrations are also generated, that are transmitted to bicycle and cyclist who is obliged to pedal in uncomfortable conditions.

In an effort to remove such drawbacks, braking assemblies were made in which the braking rollers are contacted with the rim of the driving wheel instead

of the tyre.

More particularly the braking assembly comprises a couple of opposed contrasting rollers that are holding a grip with the edge of the rim of the driving

CLAIMS

1) A braking assembly (1) for bicycles (B) particularly adapted for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel (R) through the pedals (P), said braking means (3) comprising at least a flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of said driving wheel (R) for at least a portion of its circumference and wound as a closed loop between at least a couple of revolving rollers (5, 6), at least one of said rollers being operatively connected to energy dissipation means (7), said couple of revolving rollers (5, 6) being part of a rigid frame (8) supported by a support bracket (9) constrained to said support structure (2; F), said rigid frame (8) being connected to said support bracket (9) through adjustment means (10) adapted to change its position in respect of said tyre (C) of said driving wheel (R), characterized in that said energy dissipation means (7) comprise a disc (14) of amagnetic material fixedly keyed to said first roller (5) with the surface arranged between a couple of magnetic pieces (17a, 17b) supported by a moveable fork (18) integral with said rigid frame (8) and connected to actuating means (22) adapted to move said magnetic pieces (17a, 17b) in respect of said disc (14).

2) The braking assembly (1) according to claim 1) characterized in that said amagnetic disc (14) is connected to said first roller (5) through a fly wheel (15) with cooling fan (16), both coaxial with said first roller (5).

3) The braking assembly (1) according to claim 1) characterized in that said disc of amagnetic material (14) is arranged inside a case (20) fixed to said rigid frame (8) and provided with guide means (19) for sliding said moveable fork (18).

4) The braking assembly (1) according to claim 1) characterized in that said actuating means (22) comprise a flexible wire (22a) fixed at one end to said moveable fork (18) and at the opposite end to a control lever (22b) supported by the handlebar of said bicycle (B).

5) The braking assembly (1) according to claim 1) characterized in that said rigid frame (8) is connected to said support bracket (9) also through blocking means (11) adapted to fix said frame in the position defined by said adjustment means (10).

6) The braking assembly (1) according to claim 1) **characterized in that** said adjustment means (10) comprise at least a screw (24, 25) with control means (24a, 25a) integral with said support bracket (9), said screw being coupled with a nut-screw (29, 30) fixed to said rigid frame (8).

5 7) The braking assembly (1) according to claim 5) **characterized in that** said blocking means (11) comprise at least a screw (31, 32) protruding from said rigid frame (8) and threaded in a slit (33, 34) made in said support bracket (9) to which is fixed through a nut-screw (35, 36) with control handle (35a, 36a).

10 8) The braking assembly (1) according to claim 1) **characterized in that** said couple of revolving rollers comprises a first roller (5) operatively connected to said energy dissipation means (7) and a second roller (6), said flexible belt (4) being wound between said rollers, said rollers (5, 6) having substantially horizontal and parallel rotation axes (5b, 6b).

15 9) The braking assembly (1) according to claim 8) **characterized in that** said first roller (5) on its outer surface has grooves (5a) cooperating with corresponding grooves (4a) made on the inner surface of said flexible belt (4).

20 10) The braking assembly (1) according to claim 1) **characterized in that** said revolving rollers (5, 6) have the corresponding rotation axes (5b, 6b) arranged at the same distance (d) from the hub of said driving wheel (R) for any position in which said frame (8) places the flexible belt (4) adhering to said tyre (C).

25 11) The braking assembly (1) according to claim 1) **characterized in that** said rigid frame (8) comprises a couple of parallel side members (8a, 8b) rigidly connected to one another through a couple of fixed pins (12, 13) each of them being the pivot pin of a corresponding roller (5, 6).

30 12) The braking assembly (1) according to claim 1) **characterized in that** said support bracket (9) consists of a couple of facing half brackets (26, 27) between which said rigid frame (8) is arranged.

13) The braking assembly (1) according to claim 12) **characterized in that** said support bracket (9) is fixed to a support stand (2) supporting said bicycle (B) arranging it in a vertical fixed position with the driving wheel (R) raised from the ground (T).

35 14) The braking assembly (1) according to claim 13) **characterized in that** said support stand (2) supports said bicycle (B) at the hub (M) of the

- 10 -

driving wheel (R).

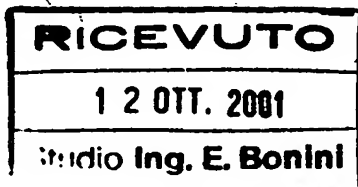
15) The braking assembly (1) according to claim 12) characterized in that said support bracket (9) is fixed to the back fork (F) of the frame of said bicycle (B).

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

BONINI, Ercole
STUDIO ING. E. BONINI SRL
Corso Fogazzaro 8
36100 Vicenza
ITALIE



PCT

WRITTEN OPINION

(PCT Rule 66)

Date of mailing (day/month/year)	05.10.2001
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Applicant's or agent's file reference
45.113 GIST

REPLY DUE **within 2 month(s)**
from the above date of mailing

International application No.
PCT/IB00/01452

International filing date (day/month/year)
29/09/2000

Priority date (day/month/year)
01/10/1999

International Patent Classification (IPC) or both national classification and IPC
A63B69/16

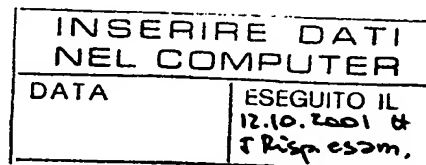
Applicant

GIST SNC DI PAROLIN LUIGI E CAMILLO & C. et al.

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain document cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application



3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 01/02/2002.

Name and mailing address of the international preliminary examining authority:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner

DIAZ, M

Formalities officer (incl. extension of time limits)
Goenechea Olmos, A
Telephone No. +49 89 2399 2664



I. Basis of the opinion

1. With regard to the **elements** of the international application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".):

Description, pages:

1-7 as originally filed

Claims, No.:

1-17 as originally filed

Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1
Inventive step (IS)	Claims	1-17
Industrial applicability (IA)	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) Reference is made to the following documents:

D1: GB 475 207 A

D2: US-A-5 916 067

- 2) D1 discloses a braking assembly for bicycles particularly adapted for training of cyclists, constrained to a support structure (10, 11, 12) and
- provided with braking means (49, 37, 38) cooperating with the driving wheel (30) of said bicycle to generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel (30) through the pedals (see page 3, lines 64-77),
 - said braking means (49, 37, 38) comprise at least a flexible belt (37) with mainly longitudinal development arranged with perimetral adherence to tyre (31) of said driving wheel (31) for at least a portion of its circumference (see fig. 1) and
 - wound as a closed loop between at least a couple of revolving rollers (38),
 - at least one of said rollers being operatively connected to energy dissipation means (friction between the tyre 31 and the belt 37).

Therefore, the subject-matter of claim 1 does not meet the novelty requirements of Art. 33(2) PCT.

3) D1 discloses the additional features of claims:

~~6~~ (see fig. 6)

~~8~~, 15, 16 (see fig. 1)

~~9~~ (see items 39 and 40)

D2 discloses the additional features of claims:

~~2, 3~~ (see fig. 2 for the support structure and column 6, lines 43-49)

~~7~~ (see fig. 7)

- 14 (see fig. 3)

- 17 (see fig. 1)

Dependant claims 4, 5, 10-13 propose additional features which appear to be a matter of normal design procedure for the skilled person.

Therefore, the subject-matter of claims 2-17 does not involve an inventive step (Art. 33(3) PCT).

Re Item VII

Certain defects in the international application

If the applicant files new clarified claims, following should be taken into account:

- Rules 5.1 (a) (ii) PCT reference to the document D1 and its disclosure.
The subject-matter of the independent claims should include some technical difference over the disclosure of documents D1 and D2, considered in combination, so as to permit a finding that that claim has inventive step over the prior art.
- Rule 5.1 (a) (iii) PCT: description in conformity with the new claims.
- Art. 34 (2) (b) PCT: The applicants are requested to identify in their reply those passages of the application as originally filed which form a basis for the amendments.

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT / 18 00 / 01 45 2
International Application No.
29 SEPTEMBER 2000
International Filing Date (29.09.00)
INTERNATIONAL BUREAU OF PATENT COOPERATION
Name of receiving Office and "PCT International Application"
Applicant's or agent's file reference (if desired) (12 characters maximum) 45.113 GIST

Box No. I TITLE OF INVENTION	
BRAKING UNIT FOR BICYCLES	
Box No. II APPLICANT	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	
GIST SNC di Parolin Luigi e Camillo & C. Via Ramon 10 36028 ROSSANO VENETO (VI) ITALY	
<input type="checkbox"/> This person is also inventor.	
Telephone No.	
Facsimile No.	
Teleprinter No.	
State (that is, country) of nationality: IT	State (that is, country) of residence: IT
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box	
Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	
PERUZZO Massimo Via S. Pio X 44 36027 ROSA' (VI) ITALY	
This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)	
State (that is, country) of nationality: IT	State (that is, country) of residence: IT
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input checked="" type="checkbox"/> the States indicated in the Supplemental Box	
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
BONINI Ercole STUDIO ING. E. BONINI SRL Corso Fogazzaro 8 36100 VICENZA ITALY	
Telephone No. 0039 0444 324570	
Facsimile No. 0039 0444 230574	
Teleprinter No.	
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

Sheet No. 2

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
<i>If none of the following sub-boxes is used, this sheet should not be included in the request.</i>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p>PAROLIN Gilberto Via T. Zanon 31 36028 ROSSANO VENETO (VI) ITALY</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input checked="" type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality: IT	State <i>(that is, country)</i> of residence: IT
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input checked="" type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p><input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.</p>	

See Notes to the request form

Supplemental Box *If the Supplemental Box is not used, this sheet should not be included in the request.*

1. If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

- (i) if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
- (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;
- (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;
- (iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
- (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
- (vi) if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;
- (vii) if, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed.

2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

3. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.

Continuation of Box III

Name of Applicants: PERUZZO Massimo
PAROLIN Gilberto

Countries: CANADA and USA

Sheet No. 5

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: * regional Office	international application: receiving Office
item (1) (01.10.1999) 01 OCTOBER 1999	VI99A000202	ITALY		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / EP

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 5

description (excluding sequence listing part) : 8

claims : 3

abstract : 1

drawings : 6

sequence listing part of description : _____

Total number of sheets : 23

This international application is accompanied by the item(s) marked below:

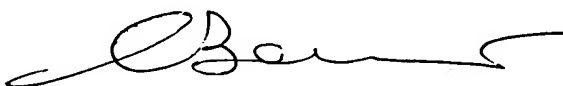
1. ☒ fee calculation sheet2. ☐ separate signed power of attorney3. ☐ copy of general power of attorney; reference number, if any:4. ☐ statement explaining lack of signature5. ☐ priority document(s) identified in Box No. VI as item(s):6. ☐ translation of international application into (language):7. ☐ separate indications concerning deposited microorganism or other biological material8. ☐ nucleotide and/or amino acid sequence listing in computer readable form9. ☐ other (specify):

Figure of the drawings which should accompany the abstract: 2

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).


The Agent
(BONINI Ercole)

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application: 29 SEPTEMBER 2000	29.09.00	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA / EP	6. <input checked="" type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

For International Bureau use only	
Date of receipt of the record copy by the International Bureau: 16 OCTOBER 2000	(16.10.00)

1 / 6

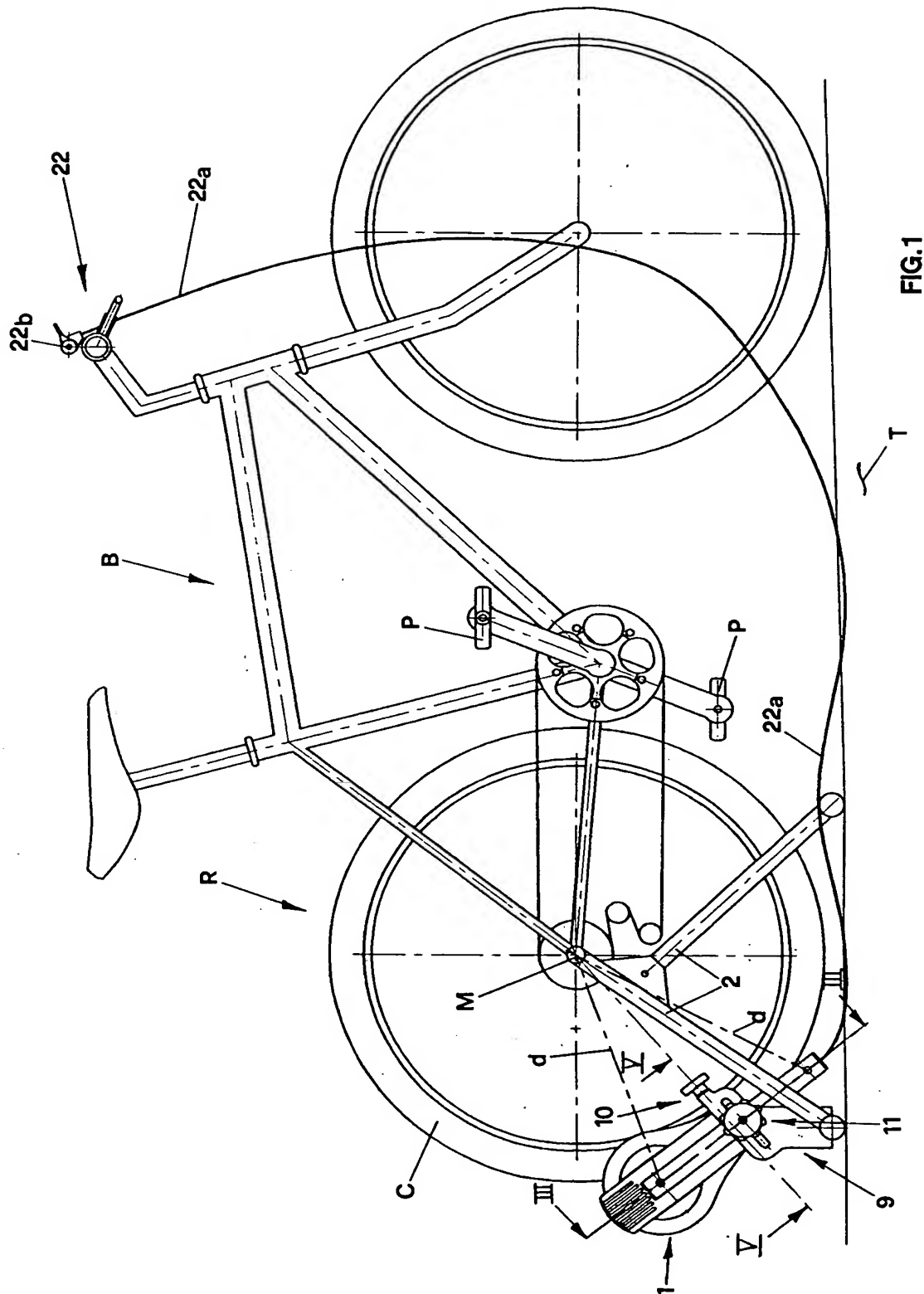
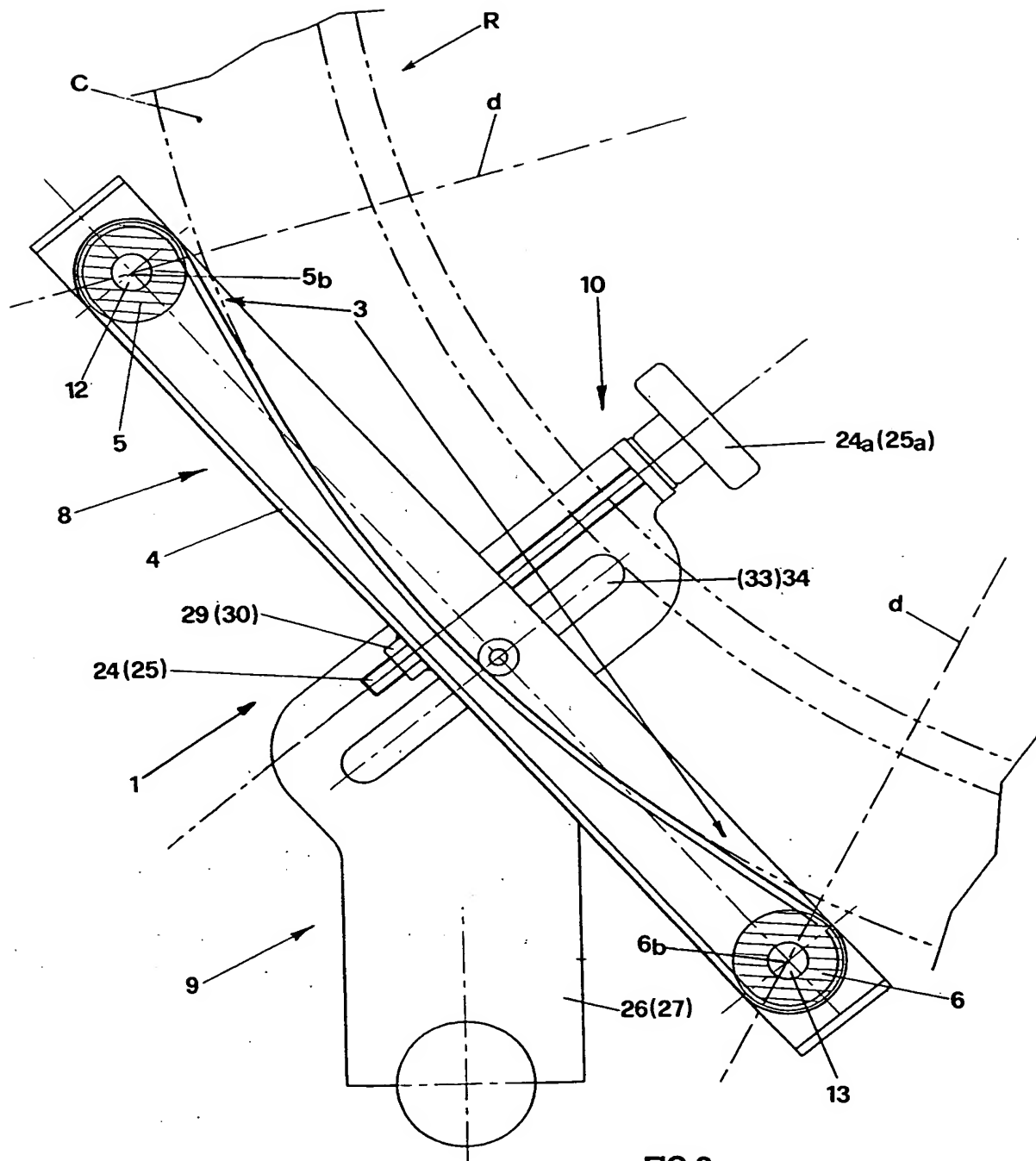
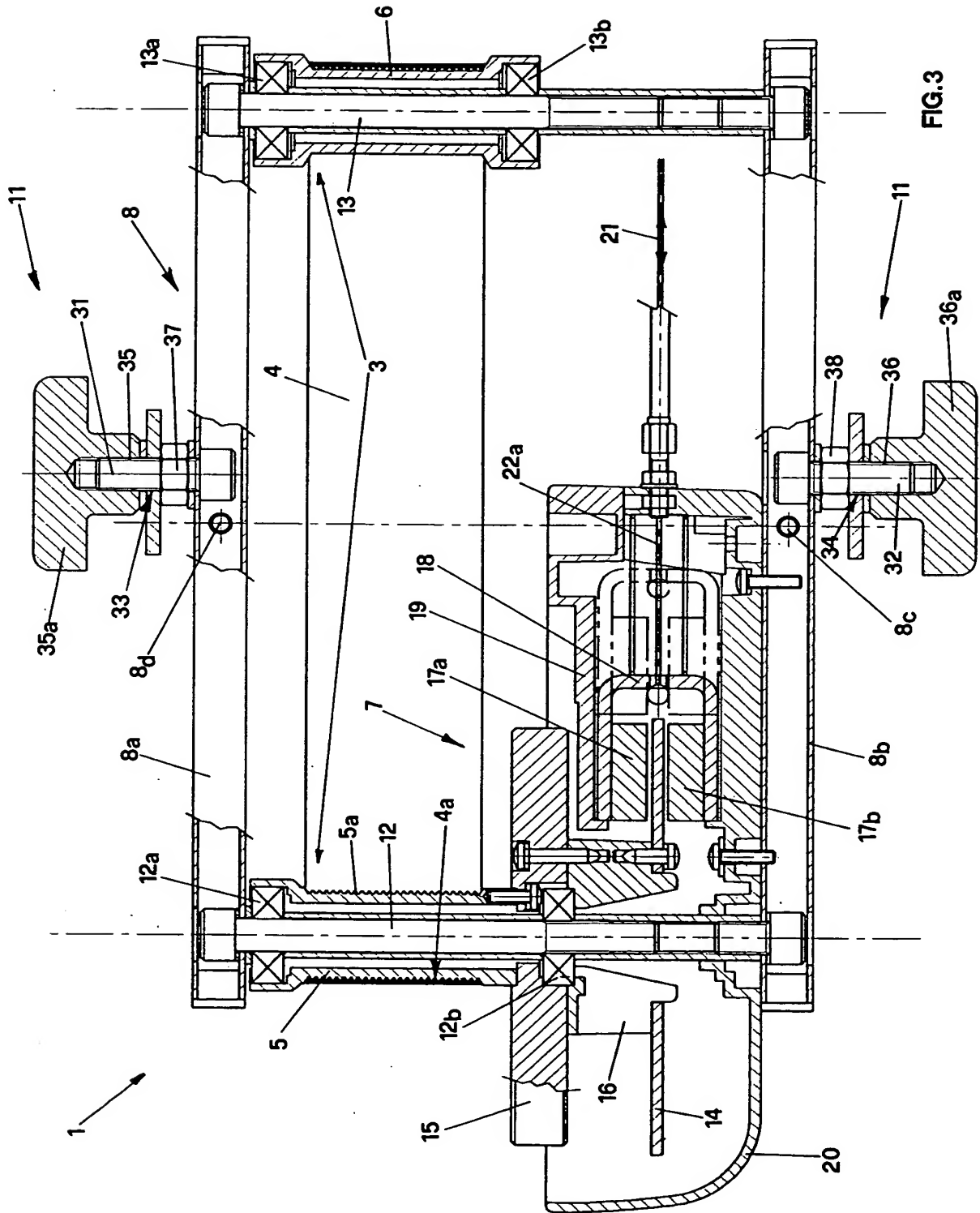


FIG. 1

2/6



3/6



4/6

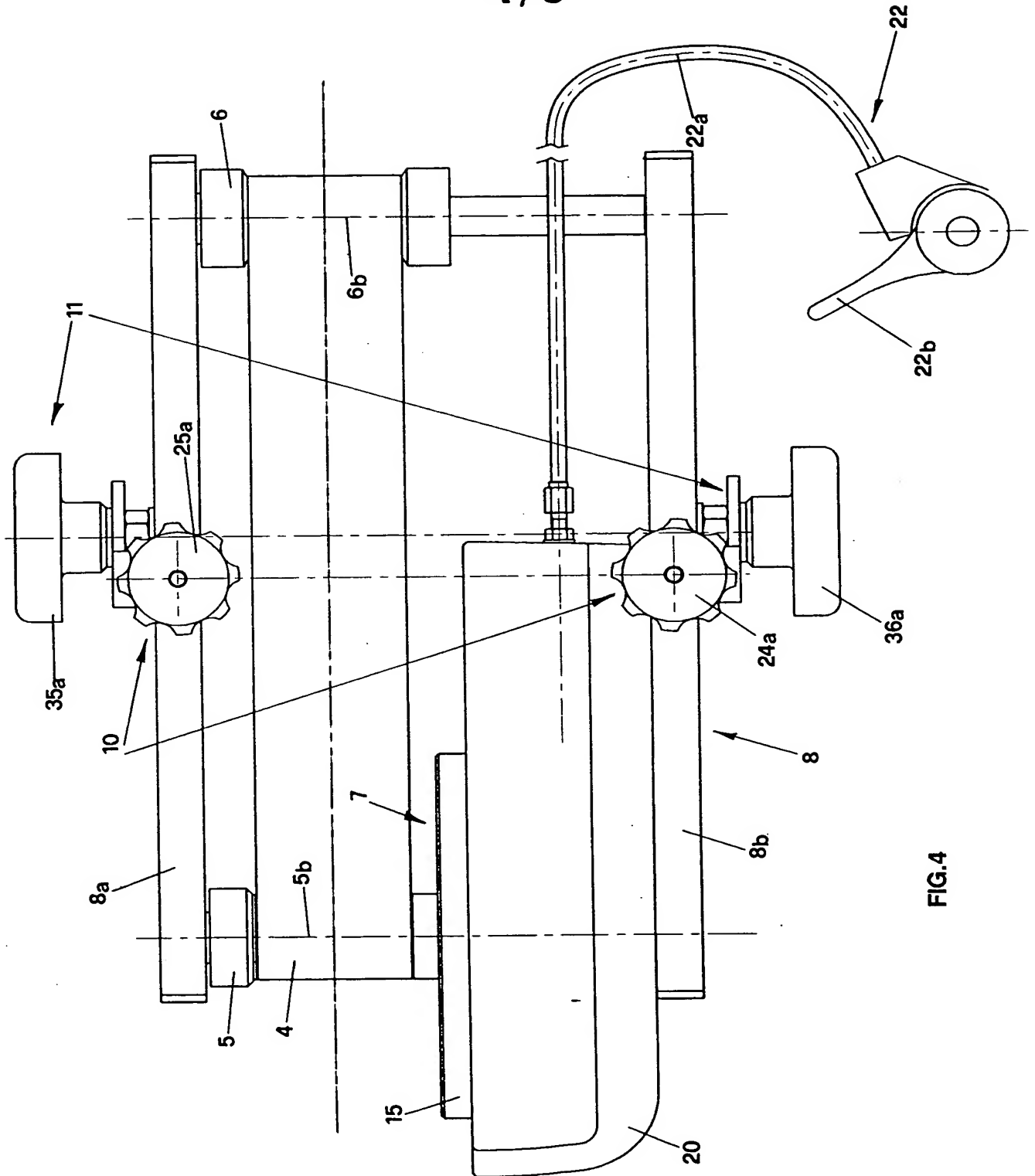
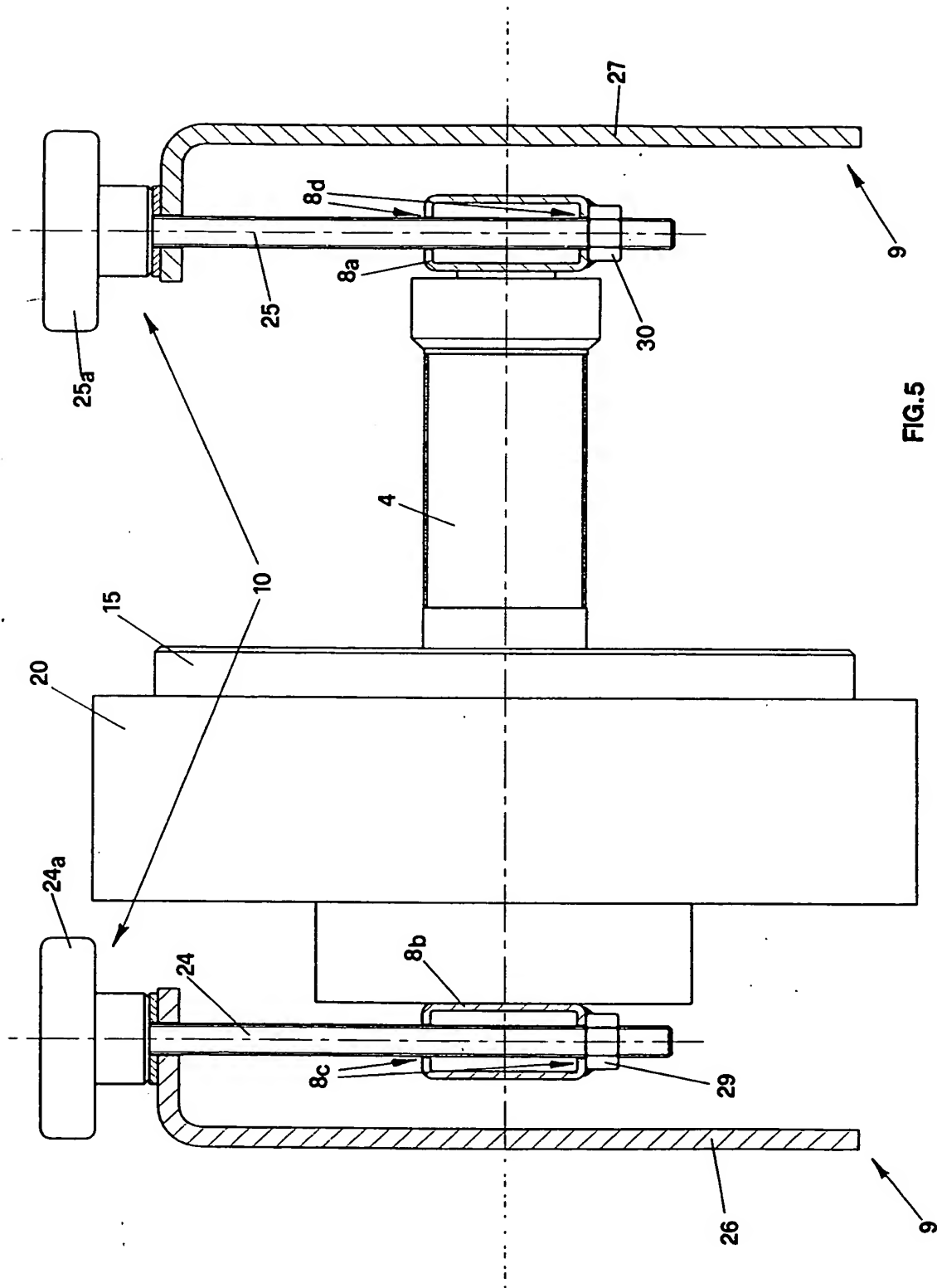
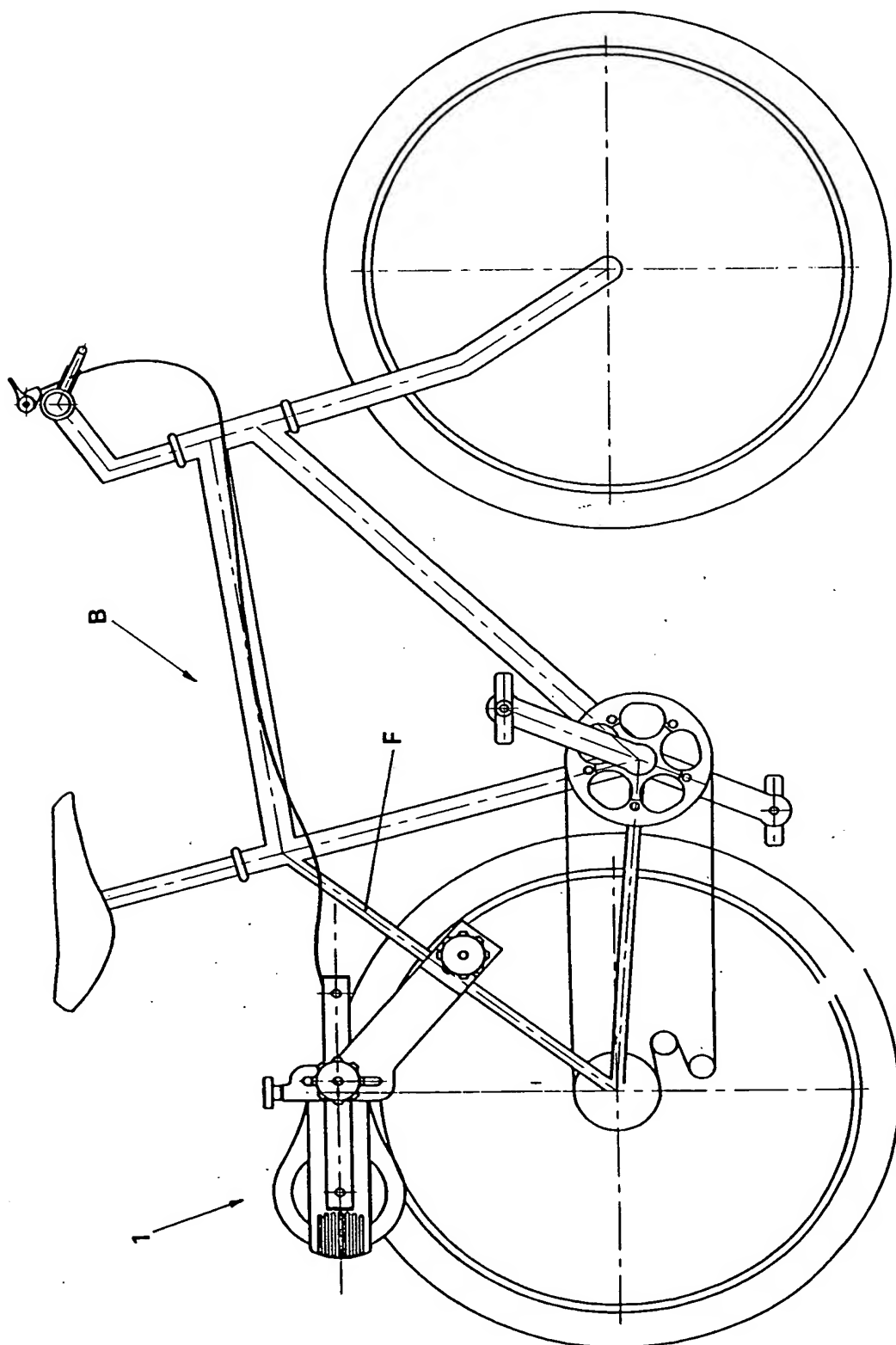


FIG.4

5/6



6/6



GRUPPO DI FRENATURA PER BICICLETTE

L'invenzione concerne un gruppo di frenatura per biciclette atto a consentire l'allenamento dei ciclisti.

5 E' noto che i ciclisti che si vogliono allenare impiegando la propria bicicletta, usano appositi gruppi di frenatura che vengono disposti in presa con la ruota motrice per creare una coppia resistente regolabile che si oppone alla rotazione imposta con i pedali.

10 In particolare i gruppi di frenatura di tipo noto vengono applicati a banchi di frenatura utilizzabili nelle palestre, ed in genere in ambienti chiusi, i quali comprendono un treppiede che supporta la bicicletta disponendola in posizione verticale con la ruota motrice sollevata da terra ed in presa con i mezzi di frenatura.

15 Secondo le realizzazioni note, i gruppi di frenatura comprendono uno o più rulli ad asse sostanzialmente orizzontale posti a contatto con il copertone della ruota motrice e collegati ad un freno elettromagnetico, fluido-idraulico o meccanico, provvisto di mezzi di regolazione atti a variare la coppia resistente. I gruppi di frenatura del tipo testé descritto presentano però alcuni inconvenienti.

20 Un primo inconveniente è costituito dal fatto che durante l'impiego tra la ruota e il rullo o i rulli frenanti si genera un attrito che deteriora rapidamente il copertone.

Considerando che soprattutto nel caso di biciclette da corsa i copertoni sono realizzati in materiali speciali e sono quindi particolarmente costosi, si comprende che questo comporta un inutile aggravio di costi per l'utilizzatore.

25 Un ulteriore inconveniente è anche costituito dal fatto che durante il funzionamento si genera una notevole rumorosità che in taluni casi, come per esempio se il gruppo di frenatura viene applicato a banchi di frenatura usati in palestre ed in generale in ambienti chiusi, può non essere tollerabile.

30 L'impiego dei gruppi di frenatura sopra citati risulta particolarmente problematico qualora essi vengano utilizzati con biciclette del tipo mountain-bike, provviste di copertoni con battistrada a scolpitura profonda.

35 In questo caso oltre al rilevante consumo del copertone della ruota motrice ed alla maggior rumorosità di funzionamento, si generano anche fastidiose vibrazioni che vengono trasmesse alla bicicletta ed al ciclista, il quale è costretto a pedalare in condizioni del tutto disagiati.

Nel tentativo di eliminare tali inconvenienti, sono stati realizzati gruppi di frenatura nei quali i rulli frenanti vengono posti a contatto con il cerchione della ruota motrice anziché con il copertone.

5 Più in particolare il gruppo di frenatura è composto da una coppia di rulli di contrasto tra loro contrapposti che vengono posti in aderenza ai bordi del cerchione della ruota motrice la quale viene mantenuta sollevata da terra da un cavalletto fissato al mozzo.

10 I gruppi di frenatura a rulli contrapposti ed i relativi banchi di frenatura sopra citati, risolvono effettivamente il problema della rumorosità e del consumo dei copertoni e possono essere impiegati sia per biciclette da corsa che per biciclette del tipo mountain-bike.

15 Essi però presentano ulteriori inconvenienti uno dei quali è costituito dal fatto che i gruppi di frenatura con rulli laterali, presentano costi notevolmente maggiori rispetto ai gruppi di frenatura con rulli tangenziali alla ruota e questo è dovuto alla maggiore complessità meccanica dei primi.

20 Un ulteriore inconveniente è costituito dal fatto che il montaggio della bicicletta su banchi di frenatura che impiegano i suddetti gruppi di frenatura, risulta meno agevole e meno rapida in quanto richiede l'utilizzo di un particolare meccanismo che appartiene al gruppo di frenatura stesso, atto ad allargare i rulli di contrasto per permettere di inserire la ruota tra di essi.

Non ultimo inconveniente è costituito dal fatto che tra cerchione e rulli di contatto, si manifesta un attrito che costringe l'utilizzatore a sostituire periodicamente questi ultimi per mantenere il gruppo di frenatura sempre in perfetta efficienza.

25 La presente invenzione intende eliminare gli inconvenienti detti.

In particolare è un primo scopo dell'invenzione di realizzare un gruppo di frenatura per biciclette che rispetto ai gruppi di frenatura del tipo noto ad esso equivalenti, riduca notevolmente il consumo del copertone della ruota motrice posta a contatto con i mezzi di frenatura.

30 E' un altro scopo che il gruppo di frenatura dell'invenzione presenti una rumorosità di funzionamento inferiore rispetto ai gruppi di frenatura di tipo noto ad esso equivalenti.

E' un ulteriore scopo che il gruppo di frenatura dell'invenzione, durante l'impiego, induca minori vibrazioni alla bicicletta.

35 E' non ultimo scopo che il gruppo di frenatura dell'invenzione sia di costruzione

più semplice e quindi anche di funzionamento più affidabile, rispetto ai gruppi di frenatura di tipo noto reperibili sul mercato ed aventi prestazioni corrispondenti.

5 Gli scopi detti sono raggiunti con la realizzazione di un gruppo di frenatura per biciclette particolarmente adatto per l'allenamento dei ciclisti, che in accordo con la rivendicazione principale è vincolato ad una struttura di supporto ed è provvisto di mezzi di frenatura cooperanti con la ruota motrice di detta bicicletta per generare una coppia resistente che si oppone alla rotazione che il ciclista applica a detta ruota motrice tramite i pedali

10 ed è caratterizzato dal fatto che detti mezzi di frenatura comprendono almeno un nastro flessibile a sviluppo prevalentemente longitudinale posto in aderenza perimetralmente al copertone di detta ruota motrice per almeno un tratto della sua circonferenza ed avvolto ad anello chiuso tra almeno una coppia di rulli girevoli, almeno uno dei quali è operativamente connesso a mezzi di

15 dissipazione di energia.

Secondo una preferita forma realizzativa i rulli girevoli appartengono ad un telaio rigido supportato da una staffa di sostegno che viene vincolata alla struttura di supporto.

Preferibilmente il gruppo di frenatura viene impiegato con un banco di

20 frenatura che comprende un treppiede che supporta la bicicletta in corrispondenza del mozzo della ruota motrice e la dispone in posizione verticale con la ruota motrice sollevata dal terreno.

Il treppiede costituisce la struttura di supporto alla quale viene fissata la staffa di sostegno del gruppo di frenatura.

25 Opportuni mezzi di regolazione del tipo vite-madrevite, consentono di variare la posizione del telaio rigido e conseguentemente del nastro flessibile rispetto alla ruota motrice, in modo da adeguare il banco di frenatura alle differenti misure di biciclette.

La coppia di rulli girevoli comprende un primo rullo a superficie interna rigata

30 collegato a mezzi di dissipazione di energia ed un secondo rullo a superficie esterna liscia, paralleli tra loro e girevoli attorno ad assi di rotazione fissi appartenenti al telaio rigido.

I mezzi di dissipazione di energia comprendono un disco in materiale amagnetico, preferibilmente alluminio, calettato fisso al primo rullo e compreso

35 tra una coppia di espansioni magnetiche supportate da una forcella mobile che

può essere spostata rispetto al disco tramite mezzi attuatori. Questi comprendono una leva di manovra fissata al telaio della bicicletta che comanda un filo flessibile il quale sposta la forcella in modo da variare le aree delle superfici delle espansioni magnetiche e dal disco tra loro affacciate.

5 Secondo una forma applicativa già citata il gruppo di frenatura dell'invenzione può essere applicato ad un cavalletto di sostegno di una bicicletta disposta con la ruota motrice sollevata da terra, così da realizzare un banco di frenatura che consente l'allenamento del ciclista in palestra oppure in luoghi domestici.

10 Secondo un'altra forma applicativa, il gruppo di frenatura dell'invenzione può essere fissato al telaio della bicicletta realizzando così la frenatura della ruota motrice durante la marcia della bicicletta stessa su strada.

Vantaggiosamente il gruppo di frenatura dell'invenzione presenta un funzionamento più silenzioso e riduce l'usura dei copertoni data l'elasticità del contatto tra copertone e nastro.

15 Inoltre, vantaggiosamente, il gruppo di frenatura dell'invenzione risulta anche più affidabile dei gruppi di frenatura di tipo noto, essendo costituito da un minor numero di elementi componenti.

Altrettanto vantaggiosamente il gruppo di frenatura dell'invenzione risulta anche di costruzione meno costosa e richiede minor manutenzione rispetto ai
20 gruppi di frenatura di tipo noto ad esso equivalenti.

Gli scopi ed i vantaggi detti verranno meglio evidenziati durante la descrizione di una preferita forma di esecuzione dell'invenzione che viene data a titolo indicativo e non limitativo e che fa riferimento alle allegate tavole di disegno nelle quali:

- 25 - la fig. 1 rappresenta la vista laterale del gruppo di frenatura dell'invenzione applicato ad una bicicletta disposta in posizione verticale fissa;
- la fig. 2 rappresenta un particolare del gruppo di frenatura e della bicicletta di fig. 1 sezionata secondo un piano verticale;
- in fig. 3 si osserva un ulteriore particolare del gruppo di frenatura di fig. 1
30 sezionato secondo il piano III-III;
- la fig. 4 rappresenta il particolare di fig. 3 non sezionato;
- la fig. 5 rappresenta un particolare del gruppo di frenatura di fig. 1 sezionato secondo il piano V-V;
- la fig. 6 rappresenta una differente applicazione del gruppo di frenatura
35 dell'invenzione.

Il gruppo di frenatura dell'invenzione è rappresentato in fig. 1, ove è indicato complessivamente con 1, e dove si osserva che esso è vincolato ad una struttura di supporto che è costituita da un cavalletto di sostegno, complessivamente indicato con 2, di una bicicletta B.

5 Il cavalletto di sostegno 2 supporta la bicicletta B in corrispondenza del mozzo M della ruota posteriore R mantenendo quest'ultima sollevata dal terreno T.

Il gruppo di frenatura 1, unitamente al cavalletto di sostegno 2, realizzano così un banco di frenatura statico per la bicicletta B, nel quale il gruppo di frenatura genera una coppia resistente che si oppone alla rotazione che il ciclista
10 impone alla ruota motrice R azionando i pedali P.

Secondo l'invenzione e con particolare riferimento alle figg. 2 e 3, i mezzi di frenatura 3 comprendono un nastro flessibile 4 a sviluppo prevalentemente longitudinale posto in aderenza perimetralmente al copertone C della ruota
15 motrice R per almeno un tratto della sua circonferenza ed avvolto ad anello chiuso tra una coppia di rulli girevoli 5, 6 uno dei quali, in particolare il primo rullo girevole 5, è operativamente connesso a mezzi di dissipazione di energia, complessivamente indicati con 7.

I rulli girevoli 5, 6 appartengono ad un telaio rigido, complessivamente indicato con 8 e visibile anche in fig. 4, ed individuano una coppia di assi longitudinali
20 di rotazione 5b, 6b tra loro paralleli.

Il telaio rigido 8 è supportato da una staffa di sostegno complessivamente indicata con 9 e stabilmente fissata al cavalletto 2, alla quale il telaio rigido 8 è collegato tramite mezzi di regolazione, complessivamente indicati con 10, atti a
variarne la posizione rispetto alla ruota motrice R.

25 Opportuni mezzi di bloccaggio 11 fissano il telaio rigido 8 nella posizione raggiunta.

Più in particolare si osserva in fig. 3 che il telaio rigido 8 comprende una coppia di longheroni 8a, 8b tra loro paralleli che sono rigidamente collegati
tramite una coppia di perni fissi 12, 13, ciascuno dei quali costituisce il perno di
30 rotazione di un rispettivo rullo 5, 6 con l'interposizione di cuscinetti di rotolamento rispettivamente 12a, 12b e 13a, 13b.

In particolare il primo rullo 5 presenta la superficie esterna provvista di
rigature 5a che cooperano corrispondenti rigature 4a realizzate sulla
superficie interna del nastro flessibile 4 mentre il secondo rullo 6 presenta la
35 superficie esterna liscia.

Il primo rullo 5, come si è già detto, è connesso ai mezzi di dissipazione di energia, complessivamente indicati con 7 che comprendono un disco 14 realizzato preferibilmente in materiale amagnetico, per esempio alluminio, calettato fisso al primo rullo 5 tramite un volano 15 ed una ventola di raffreddamento 16, il quale viene compreso tra una coppia di espansioni magnetiche 17a, 17b supportate da una forcella mobile 18 scorrevole lungo mezzi di guida 19 ricavati in un carter 20 fissato al telaio rigido 8.

In particolare il carter 20 svolge una funzione protettiva essendo sagomato in modo da contenere, come si osserva in fig. 3, il disco 14, il volano 15, la ventola 16 e la forcella mobile 18.

La forcella 18 viene fatta scorrere longitudinalmente lungo i mezzi di guida 19 secondo entrambi i versi della freccia 21 essendo collegata a mezzi attuatori 22 comprendenti un filo metallico flessibile 22a posto in tensione da una leva di manovra 22b fissata al manubrio della bicicletta.

Per quanto concerne i mezzi di regolazione, complessivamente indicati con 10, si osserva in fig. 5 che essi comprendono una coppia di viti 24, 25, ciascuna delle quali è solidale ad una corrispondente semistaffa 26, 27 che costituisce detta staffa e si accoppia in una madrevite 29, 30 fissata al telaio rigido 8 in corrispondenza di un rispettivo longherone 8a, 8b.

Ciascuna vite 24, 25 è disposta passante attraverso fori passanti 8c, 8d praticati in ciascun rispettivo longherone 8a, 8b ed è provvista ad un'estremità di un volantino di manovra 24a, 25a.

Per quanto concerne i mezzi di bloccaggio complessivamente indicati con 11 e visibili nelle figg. 3 e 4, si osserva che essi comprendono una coppia di viti 31, 32 ciascuna sporgente dal rispettivo longherone 8a, 8b del telaio rigido 8, la quale viene inserita in una corrispondente feritoia 33, 34 visibile nelle figg. 2 e 3 e praticata in ciascuna semistaffa 26, 27, alla quale viene fissata tramite una madrevite 35, 36 preferibilmente realizzata in una maniglia di manovra 35a, 36.

Controdadi 37, 38 garantiscono il bloccaggio.

Operativamente intervenendo sui mezzi di regolazione 10, si regola la posizione del telaio rigido 8 in modo da far aderire il nastro flessibile 4 al copertone C della ruota motrice R.

Tramite i mezzi di bloccaggio 11 si fissa quindi il telaio rigido 8 nella posizione di regolazione raggiunta, in modo che i rulli 5, 6, come si osserva in fig. 2, non

siano in contatto con la ruota stessa e che i loro assi longitudinali 5b, 6b siano disposti alla medesima distanza d dal mozzo M della ruota motrice R.

Il ciclista inizia la pedalata ed azionando la leva 23 fa scorrere la forcella 18 disponendola in una posizione qualsiasi compresa tra le due posizioni estreme rappresentate a tratto continuo ed a tratto interrotto in fig. 3, a seconda dello sforzo resistente che vuole realizzare.

Infatti le espansioni magnetiche 17a, 17b realizzano un effetto magnetico indotto sul disco in alluminio 14 che frena il primo rullo 5 e quindi il tappeto 4 in modo proporzionale alle aree tra loro contrapposte delle espansioni magnetiche e del disco in alluminio.

Una differente applicazione del gruppo di frenatura 1 dell'invenzione è rappresentata in fig. 6 ove si osserva che esso è vincolato alla forcella posteriore F del telaio della bicicletta B che in questo caso costituisce la struttura di supporto.

Con tale soluzione applicativa il ciclista può allenarsi in modo dinamico spostandosi con la bicicletta su strada.

Si comprende in base a quanto descritto che l'elasticità del contatto tra il copertone C ed il nastro flessibile 4 riduce il consumo del copertone C stesso e rende il funzionamento della bicicletta meno rumoroso.

In particolare la rumorosità ed il consumo non cambiano se sul banco vengono installate biciclette del tipo da corsa o biciclette del tipo mountain-bike provviste di copertone scolpito.

Si osserva anche il limitato numero di elementi componenti che semplifica la costruzione meccanica e riduce anche i relativi costi.

Inoltre essendo i perni di rotazione dei rulli di avanzamento del tappeto flessibile fissi, questo consente una maggiore precisione di funzionamento rispetto ai gruppi di frenatura di tipo noto in cui, viceversa, i perni che supportano i rulli sono perni girevoli.

Inoltre, il gruppo di frenatura dell'invenzione, in entrambe le situazioni applicative in cui esso è collegato al cavalletto che sostiene la bicicletta B oppure alla forcella posteriore F del telaio della bicicletta stessa, risulta facilmente registrabile in modo da adattare in modo ottimale l'aderenza del nastro alla superficie del copertone della ruota motrice.

E' evidente che in fase esecutiva al banco di frenatura dell'invenzione potranno essere apportate modifiche costruttive e di forma le quali, se

rientranti nell'ambito delle rivendicazioni riportate al seguito, sono da intendersi tutte protette dal presente brevetto.

RIVENDICAZIONI

1) Gruppo di frenatura (1) per biciclette (B) particolarmente adatto per l'allenamento dei ciclisti, vincolato ad una struttura di supporto (2; F) e provvisto di mezzi frenatura (3) cooperanti con la ruota motrice (R) di detta bicicletta (B) per generare una coppia resistente che si oppone alla rotazione che il ciclista applica a detta ruota motrice (R) tramite i pedali (P),
5 caratterizzato dal fatto che detti mezzi di frenatura (3) comprendono almeno un nastro flessibile (4) a sviluppo prevalentemente longitudinale posto in aderenza perimetralmente al copertone (C) di detta ruota motrice (R) per
10 almeno un tratto della sua circonferenza ed avvolto ad anello chiuso tra almeno una coppia di rulli girevoli (5, 6), almeno uno dei quali è operativamente connesso a mezzi di dissipazione di energia (7).

2) Gruppo di frenatura (1) secondo la rivendicazione 1) caratterizzato dal fatto che detta coppia di rulli girevoli (5, 6) appartiene ad un telaio rigido (8)
15 il quale è supportato da una staffa di sostegno (9) vincolata a detta struttura di supporto (2; F), detto telaio rigido (8) essendo collegato a detta staffa di sostegno (9) tramite mezzi di regolazione (10) atti a variarne la posizione rispetto a detto copertone (C) di detta ruota (R).

3) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detto telaio rigido (8) è collegato a detta staffa di sostegno (9)
20 anche tramite mezzi di bloccaggio (11) atti a fissarlo nella posizione definita tramite detti mezzi di regolazione (10).

4) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detti mezzi di regolazione (10) comprendono almeno una vite (24,
25 25) con mezzi di manovra (24a, 25a), solidale a detta staffa di supporto (9), che si accoppia ad una madrevite (29, 30) fissata a detto telaio rigido (8).

5) Gruppo di frenatura (1) secondo la rivendicazione 3) caratterizzato dal fatto che detti mezzi di bloccaggio (11) comprendono almeno una vite (31,
30 32) sporgente da detto telaio rigido (8), inserita in una feritoia (33, 34) praticata in detta staffa di sostegno (9) alla quale viene fissata tramite una madrevite (35, 36) con maniglia di manovra (35a, 36a).

6) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detta coppia di rulli girevoli comprende un primo rullo (5) operativamente connesso a detti mezzi di dissipazione di energia (7) ed un
35 secondo rullo (6) tra i quali è avvolto detto nastro flessibile (4), detti rulli (5, 6)

presentando gli assi di rotazione (5b, 6b) sostanzialmente orizzontali e tra loro sostanzialmente paralleli.

7) Gruppo di frenatura (1) secondo la rivendicazione 6) caratterizzato dal fatto che detto primo rullo (5) presenta sulla superficie esterna rigature (5a) che cooperano con corrispondenti rigature (4a) praticate nella superficie interna di detto nastro flessibile (4).

8) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detti rulli girevoli (5, 6) presentano i rispettivi assi di rotazione (5b, 6b) disposti alla medesima distanza (d) dal mozzo di detta ruota motrice (R) per qualsiasi posizione in cui detto telaio (8) dispone il rispettivo nastro flessibile (4) in aderenza a detto copertone (C).

9) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detto telaio rigido (8) comprende una coppia di longheroni (8a, 8b) tra loro paralleli e rigidamente collegati l'uno all'altro tramite una coppia di perni fissi (12, 13) ciascuno dei quali costituisce il perno di rotazione di un rispettivo rullo (5, 6).

10) Gruppo di frenatura (1) secondo la rivendicazione 6) caratterizzato dal fatto che detti mezzi di dissipazione di energia (7) comprendono un disco (14) in materiale amagnetico calettato fisso a detto primo rullo (5) con le superfici comprese tra una coppia di espansioni magnetiche (17a, 17b) supportate da una forcella mobile (18) solidale a detto telaio rigido (8) e connessa a mezzi attuatori (22) atti a spostare dette espansioni magnetiche (17a, 17b) rispetto a detto disco (14).

11) Gruppo di frenatura (1) secondo la rivendicazione 10) caratterizzato dal fatto che detto disco amagnetico (14) è collegato a detto primo rullo (5) tramite un volano (15) con ventola di raffreddamento (16), entrambi coassiali a detto primo rullo (5).

12) Gruppo di frenatura (1) secondo la rivendicazione 10) caratterizzato dal fatto che detto disco in materiale amagnetico (14) è contenuto all'interno di un carter (20) fissato a detto telaio rigido (8) e provvisto di mezzi di guida (19) per lo scorrimento di detta forcella mobile (18).

13) Gruppo di frenatura (1) secondo la rivendicazione 10) caratterizzato dal fatto che detti mezzi attuatori (22) comprendono un filo flessibile (22a) fissato con un'estremità a detta forcella mobile (18) e con l'estremità opposta ad una leva di manovra (22b) supportata dal manubrio di detta bicicletta (B).

14) Gruppo di frenatura (1) secondo la rivendicazione 2) caratterizzato dal fatto che detta staffa di sostegno (9) è composta da una coppia di semistaffe (26, 27) tra loro affacciate e tra le quali è compreso detto telaio rigido (8).

5 15) Gruppo di frenatura (1) secondo la rivendicazione 14) caratterizzato dal fatto che detta staffa di sostegno (9) è fissata ad un cavalletto di sostegno (2) che supporta detta bicicletta (B) disponendola in posizione verticale fissa con la ruota motrice (R) sollevata dal terreno (T).

10 16) Gruppo di frenatura (1) secondo la rivendicazione 15) caratterizzato dal fatto che detto cavalletto di sostegno (2) supporta detta bicicletta (B) in corrispondenza del mozzo (M) della ruota motrice (R).

17) Gruppo di frenatura (1) secondo la rivendicazione 14) caratterizzato dal fatto che detta staffa di sostegno (9) è fissata alla forcella posteriore (F) del telaio di detta bicicletta (B).

RIASSUNTO

Un gruppo di frenatura (1) per biciclette (B) particolarmente adatto per l'allenamento dei ciclisti, vincolato ad una struttura di supporto (2; F) e provvisto di mezzi frenatura (3) cooperanti con la ruota motrice (R) di detta
5 bicicletta (B) per generare una coppia resistente che si oppone alla rotazione che il ciclista imprime alla ruota motrice (R) tramite i pedali (P). I mezzi di frenatura (3) comprendono un nastro flessibile (4) a sviluppo prevalentemente longitudinale posto in aderenza perimetralmente al copertone (C) della ruota
10 motrice (R) per almeno un tratto della sua circonferenza ed avvolto ad anello chiuso tra almeno una coppia di rulli girevoli (5, 6), uno dei quali è operativamente connesso a mezzi di dissipazione di energia (7).

Translation of the Italian Patent Application No. VI99A000202

TITLE

BRAKING UNIT FOR BICYCLES

ABSTRACT

5 A braking assembly (1) for bicycles (B) is disclosed, particularly suitable for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to generate a resisting torque opposing the rotation given by the cyclist to the driving wheel (R) through the pedals (P). The braking means (3) comprise a
10 flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of the driving wheel (R) for at least a portion of its circumference and wound as a closed loop between at least a couple of revolving rollers (5, 6), one of said rollers being operatively connected to energy dissipation means (7).

15 FIGURE

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Fig. No. 2

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Description of the industrial invention being titled: "BRAKING UNIT FOR BICYCLES".

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5 DESCRIPTION

The invention relates to a bicycle braking assembly to carry out training of cyclists.

It is known that cyclists wanting to train using their own bicycle, are using proper braking assemblies that are engaged with the driving wheel to obtain an
10 adjustable resisting torque opposing its rotation carried out with the pedals.

More particularly the braking assemblies of known type are applied to braking stands used in gymnasia and generally in closed rooms, comprising a tripod supporting the bicycle which is arranged in a vertical position with the driving wheel raised from the ground and engaged with the braking means.

15 According to the state of the art devices, the braking assemblies comprise one or more rollers with a substantially horizontal axis contacting the tyre of the driving wheel and connected to an electromagnetic, hydraulic or mechanical brake provided with regulation means adapted to change the resisting torque. The above mentioned braking assemblies however have some drawbacks.

20 A first drawback consists in that in use a friction is generated between the wheel and the braking rollers so that the tyre is quickly deteriorated.

Since primarily in racing bicycles the tyres are made of special materials and therefore are particularly expensive, this is clearly an unnecessary rise of costs for the user.

25 A further drawback consists in that in use a considerable noise is generated that sometimes cannot be tolerated for instance when the braking assembly is applied on braking stands used in gymnasia and generally in closed rooms.

Use of the above mentioned braking assemblies is particularly problematic when they are used with bicycles like mountain bikes provided with tyres
30 having a tread with deep grooves.

In such a case in addition to the considerable wear of the tyre of the driving wheel and greater operation noise, annoying vibrations are also generated, that are transmitted to bicycle and cyclist who is obliged to pedal in uncomfortable conditions.

35 In an effort to remove such drawbacks, braking assemblies were made in

which the braking rollers are contacted with the rim of the driving wheel instead of the tyre.

More particularly the braking assembly comprises a couple of opposed contrasting rollers that are holding a grip with the edge of the rim of the driving wheel that is kept raised from the ground by a stand fixed to the hub.

The above mentioned braking assemblies with opposed rollers and related braking stands are actually solving the problem of noise and tyre wear and can be used both for racing bicycles and bicycles of mountain bike type.

However these assemblies have further drawbacks, one being the fact that braking assemblies with lateral rollers have costs that are considerably higher than the braking assemblies with rollers tangent to the wheel and this is due to their greater mechanical complexity.

A further drawback consists in that fitting the bicycle on the braking stand using said braking assemblies, is less easy and quick because it is necessary to use a particular device being part of the braking assembly, adapted to spread the contrasting rollers in order to place the wheel between the rollers.

Last but not least drawback consists in that a friction is generated between rim and rollers, obliging user to replace said rollers from time to time in order to keep the braking assembly always perfectly efficient.

The present invention aims to remove said drawbacks.

More particularly, a first object of the invention is a bicycle braking assembly that reduces considerably wear of the tyre of the driving wheel contacting the braking means in comparison with the braking assemblies of equivalent known type.

Another object of the invention is a braking assembly having an operation noise lower than the braking assemblies of equivalent known type.

A further object of the invention is a braking assembly inducing less vibrations in the bicycle in use.

Still a further object of the invention is a braking assembly of simpler construction and with more reliable operation in comparison with braking assemblies of known type available on the market and with corresponding performances.

These objects are attained by a bicycle braking assembly particularly suitable for training of cyclists, that according to the main claim is constrained to a support structure and is provided with braking means cooperating with the

bicycle driving wheel so as to generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel through the pedals and is characterized in that said braking means comprise at least a flexible belt with mainly longitudinal development arranged with a perimetral adherence to tyre of said driving wheel for at least a portion of its circumference and wound as a closed loop between at least a couple of rotating rollers, at least one of said rollers being operatively connected to energy dissipation means.

According to a preferred embodiment the rotating rollers are belonging to a rigid frame supported by a support bracket which is constrained to the support structure.

The braking assembly is preferably used with a braking stand comprising a tripod supporting the bicycle at the hub of the driving wheel and keeping the bicycle in a vertical position with the driving wheel raised from the ground.

The tripod is the support structure to which the support bracket of the braking assembly is fixed.

Proper adjustment means of the screw and nut screw type allow to change the position of the rigid frame and consequently of the flexible belt in respect of the driving wheel so as to adjust the braking stand to the different size of the bicycles.

The couple of revolving rollers comprises a first roller with an internal grooved surface connected to energy dissipation means and a second roller with outer smooth surface, parallel to one another and revolving around fixed rotation axes of the rigid frame.

The energy dissipation means comprise a disc of amagnetic material, preferably aluminum, fixedly keyed to the first roller and arranged between a couple of magnetic pieces supported by a moveable fork that can be moved by actuating means in respect of the disc. Such actuating means comprise an operating lever fixed to the bicycle frame and driving a flexible wire that moves the fork so as to change the surface area of the magnetic pieces and of the facing disc.

According to a mentioned embodiment the braking assembly of the invention may be applied to a support stand of a bicycle arranged with the driving wheel raised from the ground, so as to obtain a braking stand allowing training of cyclists in gymnasium or in domestic rooms.

According to another embodiment, the braking assembly of the invention may

be fixed to the bicycle frame so as to obtain braking of the driving wheel when the bicycle is running on the road.

The braking assembly of the invention advantageously shows a quieter operation and reduces tyre wear in view of the elastic contact between tyre and belt.

The braking assembly of the invention is also more reliable than the braking assemblies of known type as it comprises a lower number of components.

The braking assembly of the invention has also a less expensive construction and requires less maintenance in respect of the braking assemblies of equivalent known type.

The foregoing objects and advantages will be better understood from the description of a preferred embodiment of the invention that is given as an illustrative non-limiting example with reference to the accompanying sheets of drawings in which:

- figure 1 is a side view of the braking assembly of the invention applied to a bicycle arranged in a fixed vertical position;
- figure 2 is a vertical sectional view of a detail of the braking assembly and bicycle of figure 1;
- figure 3 is a sectional view taken along line III-III of another detail of the braking assembly of figure 1;
- figure 4 is an outer view of the detail of figure 3;
- figure 5 is a sectional view along line V-V of a detail of the braking assembly of figure 1; and
- figure 6 is a view of a different application of the braking assembly of the invention.

The braking assembly of the invention shown in figure 1 is generally indicated with reference number 1. The braking assembly is constrained to a support structure comprising a support stand generally indicated with reference number 2 for a bicycle B.

The braking assembly 1 together with the support stand 2 constitutes therefore a static braking stand for the bicycle B, where the braking assembly generates a resisting torque opposing the rotation that the cyclist gives to the driving wheel R actuating the pedals P.

According to the invention and with particular reference to figures 2 and 3, the braking means 3 comprise a flexible belt 4 with a mainly longitudinal

development arranged with a perimetral adherence to tyre C of the driving wheel R for at least a portion of its circumference and wound as a closed loop between a couple of revolving rollers 5, 6 one of which, more particularly the first revolving roller 5, is operatively connected to energy dissipation means generally indicated with reference number 7.

The revolving rollers 5, 6 are part of a rigid frame generally indicated with 8 that can be seen also in figure 4, and define a couple of longitudinal rotation axes 5b, 6b parallel to one another.

The rigid frame 8 is supported by a support bracket generally indicated with 9 and steadily fixed to stand 2, to which the rigid frame 8 is connected through adjustment means generally indicated with 10 adapted to change the position in respect of the driving wheel R.

Proper blocking means 11 are fixing the rigid frame 8 in the desired position.

More particularly it can be seen in figure 3 that the rigid frame 8 comprises a couple of side members 8a, 8b parallel to one another that are rigidly connected through a couple of fixed pins 12, 13, each of them being the pivot pin of a corresponding roller 5, 6 with the intermediate arrangement of rolling bearings 12a, 12b and 13a, 13b respectively.

More particularly the first roller 5 has an outer surface provided with grooves 5a cooperating with corresponding grooves 4a made on the inner surface of the flexible belt 4 while the second roller 6 has an outer smooth surface.

As already mentioned, the first roller 5 is connected to energy dissipation means generally indicated with reference number 7 comprising a disc 14 preferably made of amagnetic material for instance aluminum, fixedly keyed to the first roller through a fly wheel 15 and a cooling fan 16 which is arranged between a couple of magnetic pieces 17a, 17b supported by a moveable fork 18 sliding along guide means 19 of a case 20 fixed to the rigid frame 8.

More particularly case 20 has a protective function as it is so shaped as to contain disc 14, fly wheel 15, fan 16 and fork 18 as shown in figure 3.

Fork 18 may slide longitudinally along the guide means 19 in both directions of arrow 21 being connected to actuating means 22 comprising a flexible metal wire 22a tensioned by an operating lever 22b fixed to the bicycle handlebar.

With regard to the adjustment means generally indicated with 10, it can be seen in figure 5 that said means comprise a couple of screws 24, 25, each of them being integral with a corresponding half bracket 26, 27 and being

coupled to a nut-screw 29, 30 fixed to the rigid frame 8 at a corresponding side member 8a, 8b.

Each screw 24, 25 is arranged in through holes 8c, 8d made in each corresponding side member 8a, 8b and is provided at one end with a control
5 hand-wheel 24a, 25a.

As to the blocking means generally indicated with 11 shown in figures 3 and 4, it can be seen that said means comprise a couple of screws 31, 32 each protruding from the corresponding side member 8a, 8b of the rigid frame 8 and threaded in a corresponding slit 33, 34 shown in figures 2 and 3 and made in
10 each half-bracket 26, 27 which is fixed through a nut-screw 35, 36 preferably made in a control handle 35a, 36a.

Locking is obtained by lock-nuts 37, 38.

The position of the rigid frame 8 is adjusted by acting on the adjustment means 10 so as to cause the flexible belt 4 to adhere to tyre C of the driving wheel R.
15 Then the rigid frame 8 is fixed in the adjustment position so obtained through the locking means 11, so that rollers 5, 6 as shown in figure 2 do not contact said wheel and their longitudinal axes 5b, 6b are arranged at the same distance d from hub M of the driving wheel R.

The cyclist starts pedalling and actuating the lever 23 causes the fork 18 to
20 slide arranging it in any position comprised between the two end positions shown with continuous line and dashed line in figure 3 according to the desired resisting force.

Indeed the magnetic pieces 17a, 17b carry out a magnetic effect induced on the aluminum disc 14 braking the first roller 5 and therefore the belt 4 in
25 proportion to the opposite surface areas of the magnetic pieces and the aluminum disc.

A different application of the braking assembly 1 of the invention is shown in figure 6 where the assembly is constrained to the back fork F of the frame of the bicycle B that in this case constitutes the support structure.

30 With this application solution the cyclist may perform a dynamic training running with the bicycle on the road.

From the foregoing description it is to be understood that elasticity of contact between tyre C and flexible belt 4 reduces wear of tyre C and makes operation of the bicycle less noisy.

35 More particularly noise and wear do not change when on the braking stand

...
racing bicycles or bicycles like mountain bikes with grooved tyre are installed.
It is also to be pointed out that the limited number of components simplifies the mechanical construction and reduces the corresponding costs as well.

Moreover, as the pivot pins of the rollers driving the flexible belt are fixed, a
5 greater operation precision is allowed in comparison with the braking assemblies of known type in which on the contrary the pivot pins supporting the rollers are revolving pins.

Finally the braking assembly of the invention in both embodiments in which it is connected either to the stand supporting the bicycle B or to the back fork F of
10 the bicycle frame, can be easily adjusted so as to regulate in an optimal way the adherence of the belt to the surface of the tyre of the driving wheel.

It is clear that modifications of structure and shape may be made in carrying out the braking assembly of the invention that should be covered by the present patent when falling in the scope of the appended claims.

CLAIMS

1) A braking assembly (1) for bicycles (B) particularly adapted for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to
5 generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel (R) through the pedals (P), **characterized in that** said braking means (3) comprise at least a flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of said driving wheel (R) for at least a portion of its circumference and wound as a closed
10 loop between at least a couple of revolving rollers (5, 6), at least one of said rollers being operatively connected to energy dissipation means (7).

2) The braking assembly (1) according to claim 1) **characterized in that** said couple of revolving rollers (5, 6) is part of a rigid frame (8) supported by a support bracket (9) constrained to said support structure (2; F), said rigid frame
15 (8) being connected to said support bracket (9) through adjustment means (10) adapted to change its position in respect of said tyre (C) of said driving wheel (R).

3) The braking assembly (1) according to claim 2) **characterized in that** said rigid frame (8) is connected to said support bracket (9) also through
20 blocking means (11) adapted to fix said frame in the position defined by said adjustment means (10).

4) The braking assembly (1) according to claim 2) **characterized in that** said adjustment means (10) comprise at least a screw (24, 25) with control means (24a, 25a) integral with said support bracket (9), said screw being
25 coupled with a nut-screw (29, 30) fixed to said rigid frame (8).

5) The braking assembly (1) according to claim 3) **characterized in that** said blocking means (11) comprise at least a screw (31, 32) protruding from said rigid frame (8) and threaded in a slit (33, 34) made in said support bracket (9) to which is fixed through a nut-screw (35, 36) with control handle (35a,
30 36a).

6) The braking assembly (1) according to claim 2) **characterized in that** said couple of revolving rollers comprises a first roller (5) operatively connected to said energy dissipation means (7) and a second roller (6), said flexible belt (4) being wound between said rollers, said rollers (5, 6) having
35 substantially horizontal and parallel rotation axes (5b, 6b).

7) The braking assembly (1) according to claim 6) **characterized in that** said first roller (5) on its outer surface has grooves (5a) cooperating with corresponding grooves (4a) made on the inner surface of said flexible belt (4).

5 8) The braking assembly (1) according to claim 2) characterized in that said revolving rollers (5, 6) have the corresponding rotation axes (5b, 6b) arranged at the same distance (d) from the hub of said driving wheel (R) for any position in which said frame (8) places the flexible belt (4) adhering to said tyre (C).

9) The braking assembly (1) according to claim 2) **characterized in that** said rigid frame (8) comprises a couple of parallel side members (8a, 8b) rigidly connected to one another through a couple of fixed pins (12, 13) each of them being the pivot pin of a corresponding roller (5, 6).

10) The braking assembly (1) according to claim 6) **characterized in that** said energy dissipation means (7) comprise a disc (14) of amagnetic material fixedly keyed to said first roller (5) with the surface arranged between a couple of magnetic pieces (17a, 17b) supported by a moveable fork (18) integral with said rigid frame (8) and connected to actuating means (22) adapted to move said magnetic pieces (17a, 17b) in respect of said disc (14).

11) The braking assembly (1) according to claim 10) **characterized in that** said amagnetic disc (14) is connected to said first roller (5) through a fly wheel (15) with cooling fan (16), both coaxial with said first roller (5).

12) The braking assembly (1) according to claim 10) **characterized in that** said disc of amagnetic material (14) is arranged inside a case (20) fixed to said rigid frame (8) and provided with guide means (19) for sliding said moveable fork (18).

13) The braking assembly (1) according to claim 10) **characterized in that** said actuating means (22) comprise a flexible wire (22a) fixed at one end to said moveable fork (18) and at the opposite end to a control lever (22b) supported by the handlebar of said bicycle (B).

14) The braking assembly (1) according to claim 2) **characterized in that** said support bracket (9) consists of a couple of facing half brackets (26, 27) between which said rigid frame (8) is arranged.

15) The braking assembly (1) according to claim 14) **characterized in that** said support bracket (9) is fixed to a support stand (2) supporting said bicycle (B) arranging it in a vertical fixed position with the driving wheel (R)

raised from the ground (T).

16) The braking assembly (1) according to claim 15) **characterized in that** said support stand (2) supports said bicycle (B) at the hub (M) of the driving wheel (R).

5 17) The braking assembly (1) according to claim 14) **characterized in that** said support bracket (9) is fixed to the back fork (F) of the frame of said bicycle (B).